"STUDIES ON SYNTHESIS, CHARACTERIZATION AND BIOLOGICAL APPLICATIONS OF METAL COMPLEXES FROM N_2O_2 DONOR SCHIFF'S BASES"

SHORT RESUME OF THE PLAN PROPOSED FOR INVESTIGATION FOR Ph.D DEGREE UNDER THE FACULTY OF SCIENCE

To be Submitted To

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"STUDIES ON SYNTHESIS, CHARACTERIZATION AND BIOLOGICAL APPLICATIONS OF METAL COMPLEXES FROM N_2O_2 DONAR SCHIFF'S BASES"

1. Introduction :

Coordination compounds are a class of substances with chemical structures in which a central metal atom is surrounded by non metal atoms or group of atoms, called ligands, joined to it by chemical bonds. Coordination compounds encloses so many fields such as medicinal chemistry, pharmaceuticals, dignostics , ceramics, petrochemicals , dye industries, metal extraction , plastic industry, catalysis etc. They play an important role in biological processes such as photosynthesis in plants, requires chlorophyll for the process. This chlorophyll is a magnesium-porphyrin. Many enzymes that catalyse the life processes within our body are coordination complexes. One such example is that of carboxypeptidas acting as an enzyme necessary for catalyzing the process of digestion. The biological compounds such as haemoglobin, chlorophyll, and vitamin B-12 even are coordination compounds. Our body produces and consumes many complex compounds during the physiological processes.

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2. Review of literature :

Schiff's bases acts a best ligand for formation metal complexes. Schiff bases are named in honor of Hugo Schiff (1834–1915), the Italian-German chemist who synthesized the first members of this class of products containing an azomethine or imine group in 1864. Schiff bases are among the most widely used organic compounds, exhibiting a broad range of applications, such as intermediates in organic synthesis[1-4],chemosensors[5-7] and polymer stabilizers in food industry ,as dye and pigments, catalysis, Plant growth regulator, and others. Schiff bases also present a broad range of biological activities such as antiviral activity, antifungal activity, synergic action on insecticides[8] other therapeutic activity such as anti-inflammatory, allergic inhibitors reducing activity, radical scavenging, analgesic anti oxidative action for which the azomethine or imine group present in their structures, seems to play a critical role.

The mono-, di-, tri- and multi-dentate chelating Schiff base ligands are designed according to the binding environments of metal ions. The metal complexes of chiral

Schiff base ligands showed stereo selectivity in organic transformation, hence the synthesis of chiral complexes become an important area of current research in coordination chemistry[9]

Kenan Buldurun & Nevin Turan synthesized metal complexes in the development of medical science, Fe(II) and Co(II) metal complex compounds were synthesized with Schiff's base obtained through the condensation of 1-(4-aminophenyl) ethanone with 2-hydroxy-3-methoxybenzaldehyde. The reactions of the ligand with Co(II) and Fe(II) metal ions enabled six coordination compounds with octahedral geometries. The novel metal complexes were characterized by IR, elemental analyses, magnetic susceptibility, mass spectra, UV–Vis, thermogravimetry–diferential thermal analysis (TGA–DTA) and X-ray difraction analysis. The antioxidant properties of the new compounds were investigated using diferent in vitro assays[10]

Shalin kumar and Durga nath given a brief review of applications of Schiff's bases metal complexes as catalyst, dye, plant growth regulator, antiviral activity, antifungal activity, synergic action on insecticides, anti-inflammatory, allergic inhibitors reducing activity, radical scavenging, analgesic anti oxidative action[11]

B. T. Vhanale and A.T.Shinde synthesized Ni(II) and Fe(III) complexes by using Schiff base ligand [E]-2,2'-((pentane-1,3-diylbis(azanylylidene))bis(ethan-1-yl-1-ylidene))bis(naphthalen-1-ol) and its derivatives

In view of the above considerations and our work on Schiff's bases [12-13] and metal complexes[14-15] it is proposed to undertake a comprehensive study of metal complexes of new type of Schiff's base ligands. Hence the proposed research topic is **"Studies on Synthesis, Characterization and Biological Applications of Metal Complexes from N_2O_2 donor Schiff's Bases"**

3. Objectives :

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- To synthesize halosubstituted hydroxy aldehydes.
- To synthesize Schiff's bases from amines and halosubstituted hydroxy aldehydes.
- Characterization of Synthesized Schiff's bases by IR , ^{1}H-NMR, Mass and ^{13}C NMR spectral techniques
- Synthesis of metal complexes from synthesized Schiff's bases and Metal salts.
- Characterization of metal complexes by different spectral techniques.
- To study biological activity of Schiff's bases and metal complexes.

4. Methodology :

- The work starts with survey of review of Literature by referring the research books and journals.
- The reference work is further carried out by discussion with different researchers, guide and experts of proposed research work.
- To work on the synthesis halosubstituted hydroxy aldehydes.
- To synthesize Schiff's bases from amines and halosubstituted hydroxy aldehydes
- Characterization of synthesized Schiff's bases by IR , ^{1}H-NMR, Mass and ^{13}C NMR spectral techniques
- To work on synthesis of metal complexes from synthesized Schiff's bases and metal salts
- Characterization of metal complexes by different spectral techniques.
- To study biological activity of Schiff's bases and metal complexes.

5. Significance of study :

Schiff's base metal complexes plays an important role in various application such as catalytic application, Biological activities, Material Science and Nanotechnology . To synthesize metal complexes from Schiff's bases and to study biological activity of newly synthesized metal complexes is the main significance of proposed work.

6. Proposed work plan :

1) First year :

- Literature Survey
- Work on synthesis of halosubstituted hydroxyl aldehydes

2) Second Year :

- Synthesis of Schiff's bases from halosubstituted hydroxy aldehydes and amines
- Characterization of synthesized Schiff's bases by IR, ^{1}H-NMR, Mass and ^{13}C NMR spectral techniques.
- Synthesis of metal complexes from synthesized Schiff's bases and metal salts
- Characterization of metal complexes by different spectral techniques
- Practice on research writing skill of the research article by referring the research paper of various reputed journals
- Attending and Presenting the research articles in various national and international conferences.

3) Third Year :

- To study on biological applications of synthesized Schiff's bases and metal complexes
- Practice on research writing skill of the research article by referring the research paper of various reputed journals
- Attending and Presenting the research articles in various national and international conferences.
- Submission of final draft of Ph.D work .

7. References :

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